# SUMMARIZATION OF DISASTER RELATED TO THE KOBE EARTHQUAKE OF JANUARY 1995

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*On behalf of the*

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## ABSTRACT

*The Kobe Earthquake of the magnitude 7.2 occurred at 5:47 on January 17th, 1995, and its epicenter is located at the southwestern part of Kobe City. Kobe City and its adjacent areas were suffered catastrophic damages by the earthquake. After the earthquake, the Kansai branch of the Japan Engineering Geology Society researched detailed hazard mapping. As next year is the 10th anniversary of the earthquake, the branch summarized the disasters and digitalized results are published, using Live-CD GRASS GIS based application.*

## 1 JAPAN ENGINEERING GEOLOGY SOCIETY, KANSAI BRANCH

The Kansai branch of the Japan engineering geology society (JSEG) is actively working in many fields of the engineering geology in Keihanshin district (Osaka, Kyoto, Kobe and other cities). It has the oldest among seven branches of the society, and established the 30th anniversary last year. The Kansai branch of JSEG undertook progressive initiatives in engineering geology to commemorate every tenth anniversary of its existence and highlighted its important social responsibility.

For its 30th anniversary celebrations, the Kansai branch of JSEG has undertook the task of generalizing the damage related to the Kobe earthquake of 1995 (formerly known as the Hyogoken Nanbu Earthquake) with the aim to make basic information on earthquake damage utilizable in planning disaster mitigations measures for the future.

## 2 KOBE **EARTHQUAKE AND DISASTERS**

The Kobe Earthquake of the magnitude 7.2 occurred at 5:47 on January 17th, 1995, and its epicenter is located at the Akashi Strait near Awaji Island. This earthquake, was a remarkable disaster. Human damage, houses and official buildings, and also main infrastructures, such as traffic routes, namely roads and railroads, lifelines, harbor facilities, other civil engineering constructions in Hanshin area (between Kobe city and Osaka city) suffered devastating damages. After the earthquake, the fire occurred in the western part of Kobe city and many human damages and a numerous houses completely disappeared. The main damages were as follows.

| | |
|---|---|
| Human damages | |
| dead or missing | 6,435 |
| injured | 48,792 |
| | |
| Damages to houses | |
| completely destroyed | 104,906 |
| half destroyed | 144,274 |
| partly destroyed | 263,702 |

## 3 SUMMARIZATION OF GROUND HAZARDS

The summarization of the disaster data caused by the Kobe Earthquake has been mainly subjected ground hazards and related disasters. They are four parts, that is, Osaka plain, coastal area surrounded the Osaka Bay, Rokko Mountains and foot hills. Each area is unique and characteristic hazards, as shown bellow:

Osaka Plain and Low Terrace (mainly alluvium)
Destroyed houses, roads rail roads, lifeline and other infrastructures by strong vibration
Coastal area of the Osaka bay (mainly fills on alluvium in sea)
Destroyed large scale fills in coastal areas by liquefaction
Mountainous area (Rokko) (mainly composed of granite)
Occurrence of landslide and debris flow hazards
Hill areas in the foot of Rokko Mountains (fills on Quaternary sediments)
Destroyed houses on fills due to landslides

## 4 DIGITALZATION OF DISASTER DATASETS

Many disaster data of ground hazards are gathered and re-examined to construct as newly generalized data. The unique feature was that these datasets are provided as digital data on CD-ROMs or DVD-ROM. The users are able to visualize the data, Knoppix Live-CD implementation of GRASS GIS. Further, the users are also able to use the data for analysis by combining other data, such as geological data, seismic data, civil engineering data and social data. As a result of this initiative, many researchers and students are now able to use these datasets in their research work and examine the data in terms of future disasters scenarios.

The possibility that another gigantic earthquake (Magnitude, over 8) will occur in the Nankai Trough, which lies along southern part of Southwest Japan in the next fifty years, can not be ruled out. We believe that the publication of data on Kobe earthquake accompanied with ready to use software tools would be very useful for planning disaster mitigation measures.